What is claimed is:

1. A dendritic polymer having a formula selected from the group consisting of:
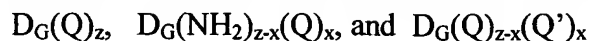
$$D_G(Q)_z, \quad D_G(NH_2)_{z-x}(Q)_x, \quad \text{and} \quad D_G(Q)_{z-x}(Q')_x$$

wherein D_G is a dendritic polymer, G is the generation number of the dendritic polymer, x has a value of from 1 to (z-1), z is an integer less than or equal to $N_c \cdot N_b{}^G$, wherein N_c is core multiplicity, N_b is branch cell multiplicity, Q has the general formula:

$$-N \begin{array}{c} \diagup CH_2 \\ \diagdown CH\ CO_2R \\ \diagup \\ O=C \diagdown (CH_2)_n \end{array}$$

wherein n has a value of from zero to 3 Q', has the general formula:

$$-N \begin{array}{c} \diagup CH_2 \\ \diagdown CH\ CO_2R \\ \diagup \\ O=C \diagdown (CH_2)_n \end{array}$$
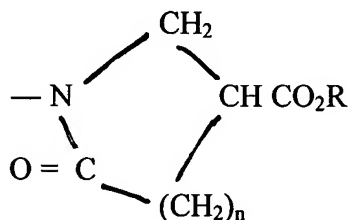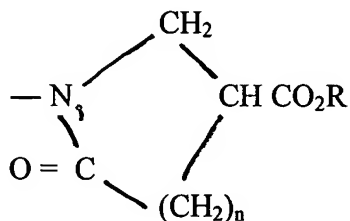
wherein n has a value of from zero to 3, wherein the value of n in Q' is not the same as the value of n in Q, and wherein R is selected from the group consisting of hydrogen, alkyl groups having from 1 to 18 carbon atoms and aryl groups having from 6 to 12 carbon atoms.

2. A process for preparing a dendritic polymer, the process comprising:

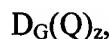   (I)   providing a precursor primary amine functional dendrimer having the general formula:

$$D_G(NH_2)_z;$$

    (II)   contacting the precursor primary amine functional dendrimer with a material having the general formula:
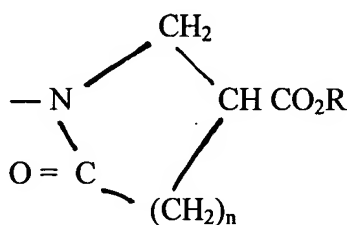
$$RO_2CC(CH_2)_nCO_2R$$

wherein R is selected from the group consisting of hydrogen, alkyl groups having from 1 to 18 carbon atoms and aryl groups having from 6 to 12 carbon atoms;

    (III) reacting (I) and (II) for a time sufficient and at a temperature sufficient to provide a dendritic polymer having the general formula selected from the group consisting of

$$D_G(Q)_z,$$

wherein D_G is a dendritic polymer, G is the generation number of the dendritic polymer, z is an integer less than or equal to $N_c \cdot N_b^{G}$, wherein N_c is core multiplicity, N_b is branch cell multiplicity, and Q has the general formula:

wherein n has a value of from zero to 3 and wherein R is selected from the group consisting of hydrogen, alkyl groups having from 1 to 18 carbon atoms and aryl groups having from 6 to 12 carbon atoms.

3. A dendritic polymer prepared by the process of claim 2

4. A process for preparing a dendritic polymer, the process comprising:

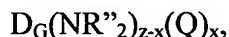   (I)   providing a precursor primary amine functional dendrimer having the general formula:

$$D_G(NH_2)_z;$$

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(II)   contacting the precursor primary amine functional dendrimer with a sub-stoichiometric quantity of a material having the general formula: o
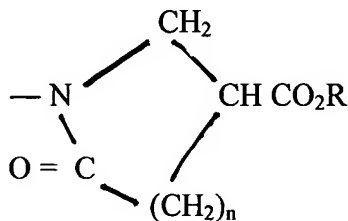
$$RO_2CC(CH_2)_nCO_2R$$

wherein R is selected from the group consisting of hydrogen, alkyl groups

5   having from 1 to 18 carbon atoms and aryl groups having from 6 to 12

carbon atoms;

.(III)   reacting (I) and (II) for a time sufficient and at a temperature sufficient to

provide a dendritic polymer having the general formula

$$D_G(NR''_2)_{z-x}(Q)_x,$$

10   wherein D_G is a dendritic polymer, G is the generation number of the

dendritic polymer, x has a value of 1 to (z-1), z is an integer less than or

equal to $N_c \cdot N_b^G$, wherein N_c is core multiplicity, N_b is branch cell

multiplicity, and Q has the general formula:

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wherein n has a value of from zero to 3 and wherein R is selected from the

group consisting of hydrogen, alkyl groups having from 1 to 18 carbon

atoms and aryl groups having from 6 to 12 carbon atoms and R" is

selected from the group consisting of hydrophobic groups, hydrophilic

25   groups, hydrogen, hydroxyl groups, and alkyl groups having 1 to 18

carbon atoms.

5.   A dendritic polymer prepared by the process of claim 4.

6.   A process for preparing a functionalized material, the process comprising:

(I)   contacting a dendritic polymer as claimed in claim 5 with a polyfunctional

30   amine;

(II)   contacting the product from (I) with additional pyrrolidone, piperidone, or

azetidinone-terminated dendritic polymers.

7. A dendritic polymer prepared by the process of claim 6.

8. A process for preparing a functionalized material, the process comprising:

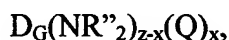(I) providing a precursor primary amine functional dendrimer having the general formula:

$$D_G(NH_2)_z;$$

(II) contacting the precursor primary amine functional dendrimer with a sub-stoichiometric quantity of a material having the general formula:
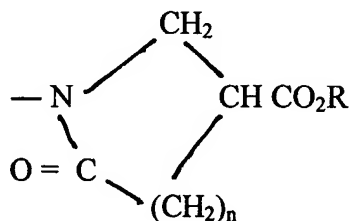
$$RO_2CC(CH_2)_nCO_2R$$

wherein R is selected from the group consisting of hydrogen, alkyl groups having from 1 to 18 carbon atoms and aryl groups having from 6 to 12 carbon atoms;

(III) reacting (I) and (II) for a time sufficient and at a temperature sufficient to provide a dendritic polymer having the general formula selected from the group consisting of

$$D_G(NR"_2)_{z-x}(Q)_x,$$

wherein D_G is a dendritic polymer, G is the generation number of the dendritic polymer, x has a value of 1 to (z-1), z is an integer less than or equal to $N_c \cdot N_b^G$, wherein N_c is core multiplicity, N_b is branch cell multiplicity, and Q has the general formula:

wherein n has a value of from zero to 3 and wherein R is selected from the group consisting of hydrogen, alkyl groups having from 1 to 18 carbon atoms and aryl groups having from 6 to 12 carbon atoms, and reacting the product from (iii) with material that will react with residual amine groups in the dendritic polymer to provide a functional group selected from the group consisting of (a) hydrophobic groups and (b) hydrophilic groups.

9. A process as claimed in claim 8 wherein (a) and (b) are selected from the group consisting of (i) acrylates, (ii) epoxides, and (iii) acids.

10. A dendritic polymer prepared by the process of claim 8.

11. A dendritic polymer prepared by the process of claim 9.

12. A process for preparing a functionalized material, the process comprising:

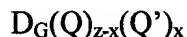   (I)   providing a precursor primary amine functional dendrimer having the general formula:

$$D_G(NH_2)_z;$$

   (II) contacting the precursor primary amine functional dendrimer with a mixture of materials having the general formula:
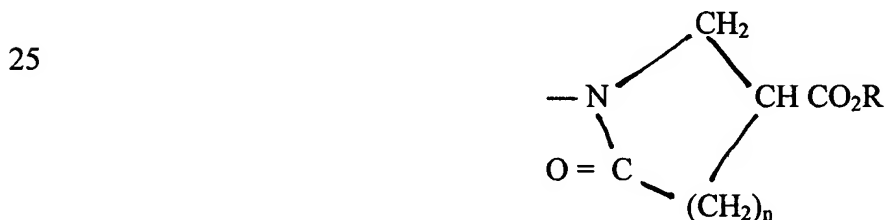
$$RO_2CC(CH_2)_nCO_2R$$

   wherein each of the materials have a different value for n, and wherein R is selected from the group consisting of hydrogen, alkyl groups having from 1 to 18 carbon atoms and aryl groups having from 6 to 12 carbon atoms;
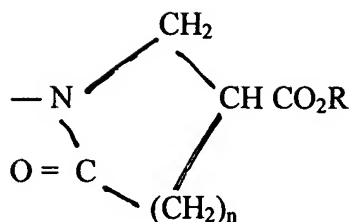
   (III) reacting (I) and (II) for a time sufficient and at a temperature sufficient to provide a dendritic polymer having the general formula

$$D_G(Q)_{z-x}(Q')_x$$

   wherein D_G is a dendritic polymer, G is the generation number of the dendritic polymer, x has a value of 1 to (z-1), z is an integer less than or equal to $N_c \cdot N_b{}^G$, wherein N_c is core multiplicity, N_b is branch cell multiplicity, Q has the general formula:

$$-N \begin{array}{c} CH_2 \\ \diagup \quad \diagdown \\ \quad\quad CH\ CO_2R \\ \diagdown \quad \diagup \\ (CH_2)_n \end{array}$$
$$\begin{array}{c} \diagdown \\ O=C \end{array}$$

   wherein n has a value of from zero to 3, Q' has the general formula:

$$-N \begin{array}{c} CH_2 \\ \diagup \quad \diagdown \\ CH\ CO_2R \\ \diagup \\ O=C \diagdown \\ (CH_2)_n \end{array}$$

wherein n has the value of 0 to 3 and wherein the value of n in Q'is different than the value of n in Q, and wherein R is selected from the group consisting of hydrogen, alkyl groups having from 1 to 18 carbon atoms and aryl groups having from 6 to 12 carbon atoms.

13. A dendritic polymer prepared by the process of claim 12.

14. A dendritic polymer as claimed in claim 13 wherein Q is

$$-N\text{-}CH_2 - CH(CO_2R) - CH_2 - C(=O)\text{-} \quad \text{and Q' is}$$

$$- N\text{-}CH_2 - CH(CO_2R) - (CH_2)_2 - C(=O)\text{-}.$$
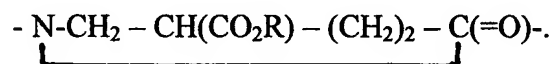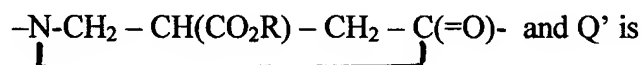
15. A process as claimed in claim 8, wherein $D_G(Q)_{z-x}(Q')_x$ is $D_G(NH_2)\ Q)_{z-x}(Q')_x$.

16. A process as claimed in claim 8, wherein $D_G(Q)_{z-x}(Q')_x$ is $D_G(NHR'')\ Q)_{z-x}(Q')_x$, wherein R'' is either a hydrophobic group or a hydrophilic group and consists of 1 to 18 carbon atoms.

17. A process as claimed in claim 8, wherein $D_G(Q)_{z-x}(Q')_x$ is $D_G(N\text{-}(R)_2)_{z-x}(Q')_x$, wherein R is either a hydrophobic group or a hydrophilic group and consists of 1 to 18 carbon atoms.

18. A dendritic polymer as claimed in claim 5 wherein R'' is –C-CC(OH)(R') wherein R' is selected from the group consisting of hydrogen and alkyl groups of 1 to 18 carbon atoms.

19. A dendritic polymer as claimed in claim 5 wherein R'' is –C(=O)R and R is a long chain acid of up to 18 carbon atoms.

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